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The Preservation of Soil-moisture by Shallow Tillage.

IN a recent issue we spoke of the necessity of surface tillage for checking the waste of soil-water by evaporation. Referring to this advice, a correspondent asks whether the stirring of the soil in hot weather does not help to hasten the drying-out process rather than retard it. Some of the most difficult problems in physics are involved in the movement of water in the soil, and no doubt there are many things yet to be learned. However, we can accept some facts as established. Some six or eight years ago there was a very general discussion by agricultural writers as to the value of summer tillage, and there were many experiments conducted in the state stations of New York, Missouri and elsewhere. From these and from data already gathered by European experimenters, it came to be accepted as generally true that ground covered with sod lost water more rapidly by evaporation than ground from which all vegetation was removed, and that ground which was stirred lightly at the surface lost less water than ground which was simply kept free from vegetation. Of course, results vary much in different kinds of soil, and there are many conditions of drainage, porosity, percentage of water to the soil, etc., to be taken into account, but the theory that most students accepted was, that water rises readily by capillary attraction through a compacted soil and it passes off in vapor when it reaches the surface. On the other hand, when the surface is stirred so that an inch or two of soil is loosened the particles are so separated that capillary attraction does not take place, and this covering laid as a mulch on the compacted earth below prevents, to a certain extent, the escape into vapor of the moisture which arises to the point where the compacted earth had been broken.

In a recent number of the *Pacific Rural Press* it is stated by General Chipman, of Red Bluff, California, that he once left off cultivating his vineyard at a critical time, having been advised that since the weather was hot the earth which he turned up would soon lose its moisture, and that each cultivation would turn up a new layer to dry out. He was told that the crust which had formed on top of his land would check the water from passing off in vapor, but his vines began to languish as cultivation ceased and he was compelled to rig up a portable tank and haul water a mile to assuage their thirst. In his dilemma he wrote to Professor Hilgard, who reminded him, in reply, that if a dry brick was laid on a wet sponge the brick would soon absorb all the water; if a dry sponge was laid on a wet brick, however, the sponge would not absorb the water. Professor Hilgard compared the crust on top of the ground to a brick on a sponge and suggested that the impacted surface was rapidly taking up the moisture and letting it off in vapor, that, therefore, the true course was to keep the ground tilled on the surface. In General Chipman's language, the surface pulverization acted like a woolen blanket thrown over ice, its non-conductive quality helping it to retain the moisture in the soil where it could be taken up by the roots.

Of course, weeds must not be left in the ground for they pump up the moisture night and day. But, besides the value of surface culture in destroying weeds, successful fruit-growers find that the practice of pulverizing the surface proves to be useful in preserving moisture. Market-gardeners assert that light summer showers, in a comparatively dry time, are often injurious rather than otherwise, for the ground at once hardens into a crust and the soil soon gives out more water to the air than has fallen in the shower. They, therefore, at once break up this crust and arrest the evaporation. Of course, deep tillage would not be advisable, even if it did not break the roots of the growing crops. All the ground that is turned up loosely or in clods loses its moisture in the hot air. The true plan is to stir the soil to a sufficient depth to make a light mulch. In California vineyards fine slant-toothed harrows are used for this purpose. Any implement which gives a light and shallow stirring to the soil is effective.

The importance of this matter will be understood when it is remembered that in most of our agricultural lands the evaporation throughout the whole season nearly equals the rainfall, which directly enters the soil, and that it is probable that during the growing season of most crops evaporation largely exceeds the rainfall. Inasmuch as plants take all their nourishment dissolved in water, it is necessary for a full crop to husband the soil-moisture with the greatest care. Hellriegel's well-known experiments show that it is probable that the water exhaled by an average Barley crop, together with that evaporated from soil, is fully equal to all the rain which falls during the growth of the crop, and that during several of the years in which the experiments at Dahme were made the rainfall was wholly insufficient for the needs of such a crop, not to speak of the large crops which can be raised in some favored regions. Many European investigators, in studying the question, have found that the rain which falls on their agricultural fields does not suffice to produce large crops, and for most temperate regions it may be considered as established that there is not enough of rain-water for really good crops. In view of these considerations, too much care can hardly be taken in ordinary seasons to check the evaporation of soil-water, so that it may be available for the use of orchards and vineyards and gardens.

GARDENING and horticulture were honored last week in this country in a manner which we believe is without a precedent. On the same day the two foremost universities of the country, Harvard and Yale, conferred upon Frederick Law Olmsted the degree of Doctor of Laws in recognition of his creative genius as a landscape-gardener, which in all parts of the country has continuously impressed itself upon American civilization from the day, forty years ago, when his conception of the Central Park, in this city, marked a distinct era in the formation of great urban parks until the celebration of the four-hundredth anniversary of the discovery of America offered him the opportunity to show to

the world assembled at Chicago the possibilities of his art in a work which of its kind has never been equaled in beauty or convenience. Last year the University at Cambridge bestowed an honorary degree upon an architect, in whose person art was thus honored; this year it is a landscape-gardener who is distinguished by two venerable seats of learning. These facts are of the highest significance, as they show more clearly than anything that has occurred before the position which art is assuming in this country and the growing appreciation in which artists are held here.

Harvard further honored herself in placing upon her roll of honorary Masters of Arts the name of Horatio Hollis Hunnewell, in recognition of his attainments in horticulture, which he has practiced with singular success for more than half a century, and which he has advanced by his own knowledge and example, and by his generous and enlightened support of every effort which has been undertaken in his time in this country to increase the knowledge of plants and the love of cultivating them.

The Use of Flowers in Ceremonies.

AN interesting article contributed to the *Nineteenth Century*, some years ago, by Mr. A. Lambert, gave us a learned summary of the extended use of flowers for solemn festivals, with many quotations from classic writers and historians, showing the high appreciation in which they were held by the ancients. From the earliest ages to the present time, among the most primitive people, as well as the most cultivated, flowers have been used in all great ceremonies as an important factor in their splendors. The barbarous Polynesian propitiates with them his cruel god and wreathes his victim for the sacrifice with their lovely forms, strewing the ground about his dead with petals and green leaves, while all travelers tell of the habit of the natives of the Pacific islands of adorning themselves with garlands on all important occasions. In India Brahma is represented as springing from a Lotus-flower, and the temples are heavy with the perfume of Jessamine and other fragrant blossoms. The shrines and steps leading to the temples of the gods are kept strewn by the priests with the Lotus, daily renewed; and in an ancient Cinghalese chronicle it is recorded that the regulations of a certain temple in the thirteenth century prescribed "every day an offering of one hundred thousand blossoms, and each day a different kind of flower." In one part of the Hindoo marriage-rite the officiating priest binds together the hands of the bride and groom with a garland of flowers, which is removed by the maiden's father during the recital of the holiest verse of the Vedas. At their burial services the Hindoos use flowers in great profusion, burying their children's bodies decked with them, and ornamenting the funeral pyre of adults with wreaths and scattered blossoms. Flowers are offered for the ten days succeeding the burning of bodies on a small altar at the door of the dead man's home, and the final ceremony of all is the journey to the burial ground of all the near kinsmen of the departed with vessels filled with flowers and roots. Wherever Buddhism prevails, in China, Japan, Tartary, Thibet and India, and throughout the eastern archipelago, floral offerings are everywhere met with—at shrines, in temples and on tombs. The Persian love of flowers is well known, and nowhere is there more sentiment expressed for the beauty of a rare blossom than in that romantic land of the Bulbul and the Rose.

Not alone in the land of Brahma, but in Egypt, was the Lotus sacred to the gods. There, too, the god of day was seen rising from its cup-like flower, and whenever an Egyptian went to worship it was with the Lotus-flower in his hand, sacred to his immortal deities. They made oblations of bouquets of prescribed form of this flower, and also offerings of single blossoms of different kinds upon the altars of Ra. In the papyri in the British Museum are many illustrations representing these rites, the colors of the flowers still beautifully preserved, as if painted yesterday. Here we see garlands laid upon the altars, and the statues wreathed with them in splendid profusion. The Helichrysos was in great request for these wreaths, both for its unfading character and its brilliant golden hue. At the feasts held in honor of the dead the guests were decked with flowers, and offerings of them were continually made in the buildings where mummies were kept before they were entombed. In military triumphs the returning armies were met at each great town by a procession of priests and leading citizens, bearing garlands and palm-branches, to welcome their return.

The wreaths and chaplets worn for ornament among the Egyptians were not only the favorite Lotus, but also the Chrysanthemum, the Anemone, the Convolvulus, Colisebay and Acacia. Plutarch tells us that when the King of Sparta visited Egypt he was so pleased with the wreaths of papyrus sent him by the king that he took some of them back with him. At feasts each guest was presented with a Lotus, which he held in his hand throughout the meal. Necklaces of flowers were also furnished, and a garland also worn upon the head, with a single Lotus bud or flower hanging down in the middle of the forehead. Flowers adorned the walls and the great jars about the room, servants constantly renewing the blossoms of the guests as they faded—a refinement of attention to which we have not yet attained at our dinners. Again, the bowl was wreathed with flowers, and a vase of Lotus-blossoms was placed upon a stand, or was presented to the master of the house by an attendant.

In our own continent the Aztecs rejoiced in floral decorations, offering them solemnly to their gods in such quantities that the effect was shown in the splendid gardens in which Mexico abounded. Flowers were presented by them on all ceremonious occasions to those they delighted to honor, to the king, to ambassadors, to people of rank; and they had a Goddess of Flowers, whose feast was annually celebrated by a flower-crowned and wreathed procession.

If among the Jews flowers were little used in sacrifice, except to wreathe the horns of the victim, we still note that the Olive and the Palm were used on solemn occasions in times of public rejoicing. Thus, Judith crowned herself with Lilies to do honor to Holofernes.

Among the Greeks and Romans the use of flowers was almost universal, and there are countless passages from their poets where they are forever embalmed in fitting verse. Particular flowers were dedicated to different deities. The Narcissus was the flower of the mighty goddesses, the Poppy was sacred to Ceres, the Anemone to Venus, the Lily to Juno, the Myrtle to Diana. Upon the altars Laurel was burned in the earliest times, and a chaplet of Violets was a holy offering. The couch on which the dead lay was strewn with blossoms, and the grave constantly adorned with wreaths. Even Caracalla laid garlands of flowers upon the tomb of Achilles when he visited it, and Ovid, when an exile, wrote to his wife: "Perform the funeral rites for me when I am dead and offer chaplets wet with your tears."

Chaplets were worn at meals among both Greeks and Romans, the Rose being esteemed then, as now, the queen of flowers. Aristophanes gives us a picture of the tipsy Alcibiades, staggering about, crowned with ivy and violets, his head bound with many fillets. So little did wreaths accord with a sobriety of character that at one time the Romans visited with severe punishment whoever appeared with one in public. The Roman bridal wreath was generally of Verbena plucked by the bride; the bridegroom also was crowned with flowers and the marriage-bed wreathed with garlands. But the laws of Rome were strenuous about the unlawful use of garlands, and a certain banker at the time of the second Punic War was imprisoned by order of the Senate for sixteen years for looking down from the balcony of a house with a wreath of Roses upon his head. Publius Munatius was put in chains for having crowned himself with flowers taken from the statue of Marsyas, and the tribunes refused to interfere in his behalf.

The Christians continued the custom of the Romans, and the stately ceremonial of the Latin Church, until this day, is always emphasized with floral decorations. Though for a time Puritan influence banished them from New England churches, the natural love of these beautiful adornments has resumed full sway, and no function is now complete without their perfumed presence.

There is no ceremony at which they are inappropriate. They come felicitously with congratulations for a birth, they decorate the débutante, and glow in the button-hole of the college graduate. They crown, with fitting sweetness, the brow of the bride; they are present at our altars, our feasts, and at our triumphs as of yore, and are the last sad tokens of affection that follow us to our long home, and brighten the sod under which we lie in our final sleep, thus attending us from the cradle to the tomb with their ever-valued ministrations.

Old trees in their living state are the only things that money cannot command. Rivers leave their beds, run into cities and traverse mountains for it; obelisks and arches, palaces and temples, amphitheatres and pyramids rise up like exhalations at its bidding; even the free spirit of man, the only thing great on earth, crouches and cowers in its presence. It passes away and vanishes before venerable trees.

—*Walter Savage Landor.*

In a Mexican Garden.

FOR a few hours of a sunny day in October last I was a guest in an old garden in a village situated by the base of the volcano of Toluca, fully 8,500 feet above the sea; and I found interest in observing what plants are employed by the Mexicans to form a flower-garden and how these succeed at so high an altitude. Light frosts fall in the region, but snows never. The season of growth extends from June to October, a short summer; and the sun during this period is obscured one-third of the time, while the temperature scarcely mounts above eighty degrees, Fahrenheit.

The garden was a quinta, that is, a large garden in the suburbs of a town, devoted usually to flowers, fruits and vegetables, mixed. In the little interior court of their town-house the ladies of the family who entertained, cared for a similar collection of plants, growing in beds in the soil around the central fountain or in great red vases set in a line just under the colonnade surrounding the court—vases of Hydrangeas, Tuberoses, Lilies, Irises, Geraniums, Fuchsias, Roses, etc. The quinta was ampler, an acre or more in extent, and was located by the threshing-floor and granaries of the hacienda, where it joined the village. It was enclosed with a high wall of adobes, more to afford seclusion and security than shelter for the plants. Hither came the family with their friends, whenever they wished to leave their close house for a ramble and an hour in the open air. To serve this use is the design of the quinta. It was laid out with broad walks and borders and was shaded by a few trees. There was the Australian Gum-tree, the furor for which of twenty years ago the Mexicans shared, having been induced to plant it to the exclusion of more beautiful native trees by a German, who had a nursery in the capital city. It succeeds here only too well; there was the Montezuma Pine, Bentham's Cypress, Bonpland's Willow, of erect growth and dark green foliage, the Weeping Willow and the Pepper-tree, with drooping branches quite as graceful as the last and with finer foliage.

Of shrubs I noted Viburnum Opulus, Datura arborea, a variety with blood-red flowers, the Crape Myrtle, the common Philadelphus, Cassia bicapsularis, with abundant yellow flowers long maintained; there were great clumps of a double-flowered Hibiscus ten feet high, Roses of choicest varieties scattered here and there, with a hedge of them hiding the back wall and overtopping it; Fuchsias in variety, six or eight feet high and woody with age, all blooming throughout most of the year, and Hydrangeas, favorite flowers with the Mexicans. Geraniums with double and with single flowers, and Pelargoniums in variety stood, shrub-like, two to five feet high. There were Cactuses leaning against the walls or climbing over them; slender-stemmed species of Cereus and thick flat-jointed Opuntias, whose flowers are among the most striking, and whose fruits are edible. The tall grass, Arundo Donax, which is not uncommon in northern gardens, stood in large old clumps, and there were patches of Ribbon Grass (Phalaris arundinacea).

Here, too, were large old masses of Agapanthus umbellatus, Mirabilis multiflora, Callas, Cannas, Crinums, Tigridias, Gladioluses and Irises, all alike thriving in the open soil. Among pretty native flowers, such as species of Salvia, Cuphea and Ipomœa, mingled many flowers whose acquaintance I made in the old-fashioned gardens of my New England home, such as Larkspurs, Marigolds, Pinks, Chrysanthemums, the Mullein Pink, the Jerusalem Cherry, the Everlasting Pea, the Bugloss, Viola odorata, V. tricolor, Œnothera biennis, Euphorbia, Lathyrus, Saxifraga crassifolia and Vinca major. To meet with these familiar flowers amid foreign scenes was like falling in with old friends abroad.

Charlotte, Vt. *C. G. Pringle.*

Botanical Notes from Texas.—IX.

CITY is a looser term in the newer than in the older portions of the country. Here a village is seldom seen. Small towns of one or two thousand inhabitants usually take upon themselves the burdens as well as the dignities of city government. So San Marcos is a little city of about three thousand persons, lying thirty miles south-west of Austin. It is a little south of the thirtieth parallel and near the ninety-eighth meridian. At San Marcos, as at New Braunfels, San Antonio, Uvalde, Del Rio and other places along the line that separates the older from the newer Texas, a river flows, fully formed, from the base of the hills, or mountains, as Texans call them. San Marcos river, after a short career of its own, joins the Blanco about two miles from the city. A few miles farther on their united waters overtake those of the Guadalupe, and with them flow on to the Gulf of Mexico.

San Marcos is an interesting locality for a botanist to visit. It is sufficiently far south-west for an abundance of the plants peculiar to that region, and few places in Texas, so easy of access, will reveal to a lover of nature more strange plant-forms. In a ramble over the bluffs near the source of the river, I met very commonly Ehretia elliptica, some individuals a foot in diameter. This is about the northern limit of the species, though it is found farther eastward. Its fruit at this writing is nearly grown.

Condalia obovata is here a foot in diameter and thirty feet tall. Its wood is, according to Sargent, of greater specific gravity than that of any other known North American forest-tree, except its Florida cogener, C. ferrea. Lippia ligustrina is abundant. A garden name for the species is Tree Heliotrope. Mexicans call it Cabradora. Guiacum angustifolium is a remarkable and handsome small tree, with narrow evergreen leaves and light purple flowers. The succeeding fruit, which is obcordate and two-lobed, contains two red seeds as large as peas. Its roots possess strong smegmatic properties; they are largely used by Mexicans in cleansing clothes, and hence its most common appellation, Soap Brush. It is also known as Lignum Vitæ, and as Guayacan. I have not before seen this species so far eastward. Morus microphylla is near by, with its fruit already ripe, and Ampelopsis heptaphylla is just coming into flower. Diospyros Texana is seen in arborescent forms, and also Xanthoxylum Pterota rarely. Parkinsonia aculeata is now in the full glory of its spring blooming. Antirrhinum maurandioides is common. The shrubby Eupatorium ageratioides hangs from the rocks and keeps company with the shrubby Salvia ballotæfolia. A Croton with a woody stem, becoming three or four feet tall, is still more common.

Of southern herbaceous plants there are Cooperia Drummondii, Chaptalia nutans, Lindheimera Texana, Lesquerella grandiflora, Gonolobus reticulata and Pinaropappus roseus. The generic name of the last-named is significant of its dirty-appearing pappus, while its handsome rose-colored flowers indicate the propriety of its specific appellation. Lindheimer's Castilleia grows in rocky places. Near it is Krameria secundiflora, bearing handsome purple flowers. Texans call its rough fruit Stump Bur. Sedum Torreyi, extending north-eastward to Missouri, is very common in central Texas.

The handsome Lupinus subcarnosus, which gives character to the flora of this region in March and April, is just fruiting and losing its beauty. I have found here a form of this species, smaller in size and of a paler green than the type, bearing pure white flowers. Vernonia Lindheimeri is here, and Black-eyed Susan, Rudbeckia bicolor.

One of the handsomest, as well as most common, plants of this region is Gaillardia pulchella. Persons who have only seen specimens of this species growing singly in the garden, can form little idea of its beauty as seen here, where it mantles acres of damp woods and prairies with its large flowers. It is known, not inappropriately, as Blanket Flower.

Rubus trivialis, the southern Dewberry, abounds everywhere in rocky places. Its pleasant fruit has furnished our hotel for three weeks with excellent pies and cobblers. Berberis trifoliata, one of the commonest shrubs around San Marcos, is now loaded to bending with its ripe red berries. Passiflora incarnata, whose pleasantly acid fruit is called Maypops in the south, is very abundant, climbing over rocks and fences.

Many species of trees and plants that are common north and east thrive well in south-western Texas. The White Elm is still found in our tour. In rich valleys it is stately and majestic. Box Elder is here handsomer than ever. A southern climate seems to suit its taste. Its light green leaves contrast pleasantly with the deeper hue of the Elms and Cottonwoods. I saw several Cypress-trees along the Blanco that were three feet in diameter. The so-called Cypress-knees are probably only abortive attempts of the species to reproduce itself from its roots. When at Lake Charles, Louisiana, I saw in the lake knees around small Cypress-trees that bore twigs and leaves. The suppression of the leaves would not hinder the knees from continuing to participate in the growth of the parent tree.

Hackberry, in many puzzling forms, if not in several species, is very abundant throughout all this region. It is more commonly planted as a street and lawn tree than any other species. Viburnum prunifolium, Ilex decidua and Callicarpa Americana are not uncommon. Two species of Cratægus, Rhamnus Carolinianus, and two species of Cornus are often to be seen. Ampelopsis quinquefolia is more common than its south-western congener, already mentioned, and all our native species of Cissus are abundant. Phytolacca decandra, Poke-weed, is as common here as in the north. The introduced Horehound is taking much of the outlying land, and the common Mullein is abundant in dry sterile places. In Kansas it is already as far west as the one-hundredth meridian.

San Marcos. *E. N. Plank.*

Foreign Correspondence.

Horticultural Education in France.—II.

OF special schools for students in horticulture France has a good number, many of which are private establishments, founded and conducted by individual enterprise, some being local institutions under the care of boards or charities, while a few, principally the National School of Horticulture, are kept up by state aid and money.

The National School of Horticulture, established in 1873 by a decree of the National Assembly (the first Legislature after the war of 1870-71), enjoys the great advantage of being located at Versailles in the buildings belonging to the ancient Potager Royal, established under Louis XIV. by La Quintinie, which was kept up as a public establishment by every successive Government in France, and may still be shown as a model fruit and vegetable garden. The Potager Royal was especially successful at the time of the Second Empire, under the able management of Mr. Hardy, who, when there was no longer an imperial household to be provided for, was left in charge of the establishment, which continued to be supported by public money, with the difference that the produce was offered for sale, and the proceeds covered, to a great extent, the cost of keeping and management. Mr. Hardy was the first Director of the School of Horticulture, and made it what it is, the very centre of horticultural training in France. Such is still the state of things, and while the students of the Horticultural School do all the garden work, they are provided with an unequaled field of study in great collections of fruit and other trees, Roses, flowering shrubs, perennial and other plants.

The severe frosts of the winter of 1879-1880 told terribly on the old Pear-trees planted by La Quintinie, only about half a dozen of which were spared. These now show pyramids of wonderful vigor, without any deficiency in limb or foliage, and are covered with fruit to the top, which rises to more than fifty feet. No less than 600 varieties of Pear-trees are grown at the Potager de Versailles, and examples of all the known forms of training are to be seen there, the "pyramide" and "contre-espalier" being in favor above all other methods.

Students are not inmates of the National School of Horticulture, but live in the town of Versailles. Many are provided for by Government or private grants, a good number are supported by towns or districts, and some by horticultural societies or by private benefactors. The age for admission is from sixteen to twenty-six. The examination for admission is not much more difficult than that at the close of a course of primary education. Forty pupils are received annually, and the entire course of teaching lasts three years. But the number of students in the second and third year is never forty, as many students are too scantily provided with means to go through the entire course, and others are called by military service before the last year is out. The classes are also reduced by the weeding which takes place at the end of each year, when such young men as fail to show ability or desire to profit by the training are dismissed from the school. The school-hours are from 5 A. M. to 7 P. M., with two hours in the middle of the day for dinner and rest. The time is divided between manual work in the different departments of the garden and study in the school-rooms; the proportion changes with the season, more open-air work being done in summer, and more class-work in winter.

The course of studies covers botany, geology, mineralogy, zöology, entomology, physics, chemistry, meteorology, mathematics, surveying, book-keeping, garden and glass-house architecture, the cultivation of vegetables, flowers and fruit both in the open air and under glass, and of trees and shrubs in nurseries. Every branch of horticulture, in fact, is practiced at the Potager de Versailles, from the production of hot-house plants to the cultivation of fruit, both in the open and under glass, the production of early peaches of American varieties being especially successful and profitable. Open-air and forced vegetables are disposed of in large quantities, and salading, mushrooms and forced melons are among the best-paying branches of the work. Some melons were sold last spring for more than thirty francs ($6.00) apiece. The elements of drawing and of English are also taught. Students are trained to do some joiner, carpenter and smith work, and to make all necessary current repairs of tools and buildings.

Good collections of drawings and pictures of the best varieties of useful plants, casts of fruit, an herbarium and collections of seeds of all kinds are at hand for the use of the students. After the complete course of study, and even when leaving the school after the second year, young men very readily find good situations, either as gentlemen's gardeners, directors of town-gardens, or as foremen in commercial establishments.

Igny, not far from Versailles, belongs to an influential charitable organization known as St. Nicholas. One of the branches of the establishment, which aims at making good operatives of orphan or destitute boys, is a school of horticulture, not so scientific in spirit as the National School, but as practical in training and provided with a sterner discipline, the boys living on the premises. About twenty-five or thirty boys annually enter the horticultural division and are kept there from two to four years. The total number of pupils and tutors in the Igny establishment being above five hundred, most of the produce is consumed in the establishment. That it would bring a good price on the market is shown by the prizes won at horticultural shows whenever the school chooses to enter the lists.

Le Val, near Meudon, another charitable institution, endowed by la Duchesse de Galliera, likewise possesses a horticultural branch. The organization resembles that at Igny, and the results are equally good. At both places the Frères des Ecoles chrétiennes are entrusted with the management and teaching, and they are highly successful.

The agricultural school at Antibes, on the Riviera, which has been in operation for the last two years only, is, properly speaking, a school for horticulture in southern France. Considerable attention is given to the cultivation of Olive, Orange and Fig-trees, and the main field crops grown here are early vegetables, and flowers for cutting or for the perfume factories, for which the Riviera is famous. Sixteen to twenty boys, aged fifteen to eighteen years, are admitted yearly and remain for two years, their time being divided much as at Versailles, with the difference that field and class-room work are taken on alternate days. The course of study comprises the same items, with the exception of the English language. A small chemical laboratory and a model dairy are attached to the establishment. A farm of about fifty acres is worked by the pupils, half of which is planted in American vines—proof against the phylloxera pest. Crops are grown with and without irrigation, to show the students the good effect and to teach them the management of running water. Several other schools exist, which come more or less under one of the three heads of private, local or national schools. The ease with which students at any of these schools find situations, either in trade establishments or in the employ of gentlemen or townships, is an interesting fact.

Paris. *H.*

New or Little-known Plants.

Xanthoceras sorbifolia.

TO Mr. Paul Dana we are indebted for the opportunity of publishing in this issue (see page 285) the portrait of a remarkably fine specimen of the rare Xanthoceras sorbifolia in Mr. Dana's collection at Dosoris.

Xanthoceras sorbifolia is a small tree of northern China, related to the Bladder-nuts and Horse-chestnuts, and interesting as the only representation of the genus to which it belongs, and which owes its name to the presence between the petals of curious yellow horn-shaped glands. It is one

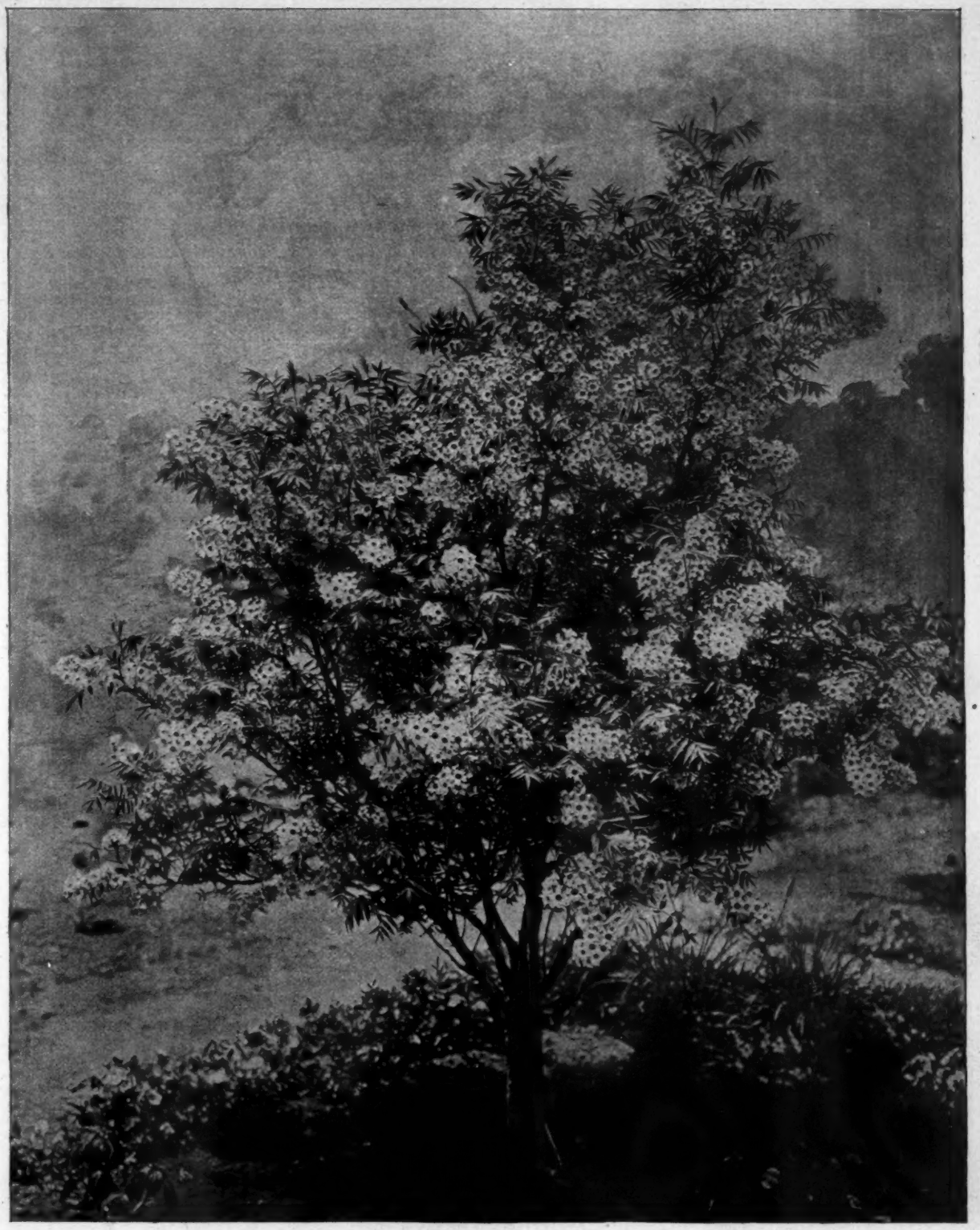

Fig. 41.—Xanthoceras sorbifolia, at Dosoris, Long Island.—See page 284.

of the most attractive of the hardy plants which our gardens owe to northern China, the region from which many of the most beautiful trees and shrubs in cultivation have been brought. It is a leafy, glabrous or puberulous plant with opposite pinnate leaves eight to twelve inches in length; the leaflets are alternate, linear-oblong, acute, coarsely serrate, dark green and glossy on the upper surface and pale on the lower. The flowers are white, hand-

somely marked with red streaks at the base of the petals, and are produced in great profusion in lateral racemes eight or twelve inches long, appearing as the leaves are unfolding. The fruit, which is a globose or pear-shaped capsule, not unlike that of some of the smooth-fruited Horse-chestnuts in general appearance, finally splits into three valves, and contains a number of globose, nearly black, shining seeds half an inch in diameter.

Xanthoceras was discovered nearly sixty years ago by the German botanist Bunge, who accompanied a Russian mission which traveled overland from St. Petersburg to Pekin; it was not, however, introduced into our gardens until nearly forty years later, when the French missionary David sent it to the Jardin des Plantes, in Paris, where the original plant may still be seen.

In spite of its hardiness and the beauty of its flowers, Xanthoceras is still rare in American and European gardens. This is, perhaps, due to the fact that, although it is hardy against cold, it is evidently fastidious and does not grow well in all soils and situations. Most of the plants which have been tried in this country have perished sooner or later, and it is unusual to find either here or in Europe so large, vigorous and healthy a specimen as the one at Dosoris.

From the Abbé David's notes we learn that Xanthoceras is a tree fifteen to eighteen feet high, and exceedingly rare in those parts of China and Mongolia which he visited; that it is cultivated in the gardens of Pekin, and that the seeds are eaten by the Chinese.

At our request, Mr. Dana has sent us for the benefit of our readers the following note upon his method of cultivating Xanthoceras, which we hope will now become a more common object in our gardens:

"I first saw a plant of Xanthoceras at Baden-Baden on the grounds of Herr Max Leichtlin about the year 1884. I admired it, and Herr Leichtlin spoke of it as a new plant of great promise, which he felt sure would be an acquisition to horticulture. I secured two plants, and have been cultivating them now for eight or ten years. They are six feet high, and grow in rich warm loam. They have no protection whatever, and yet they have never lost a branch in winter, and they endure our dry summers perfectly. They are not strong-growing shrubs, but they bear flowers in great profusion, and are more beautiful when in bloom than at any other season. They ripen seeds every year, and I would be glad to furnish some of them to any one who cares to test the plant."

Cultural Department.

Wild or Single Roses for Cultivation.

ROSE-CULTURE in gardens now almost invariably means the cultivation of the improved Hybrid Perpetual, Tea and other Roses which have been brought into existence and developed by the careful manipulation, propagation and care of the propagator and cultivator. With few exceptions, the single Roses or aboriginal types are neglected, even though their beauty is freely admired and appreciated. The practical preference for the double Roses is a very natural result of their size and lasting quality of blossom, often of their enhanced fragrance, and, especially among the hybrids, of a greater apparent diversity of color. The great defect of the single Roses for ornamental purposes is the comparative fragility of the blossoms, especially the short duration of the petals after expansion. People usually want flowers they can pick, and which will endure for some time after picking.

For very small gardens few wild Roses, except, perhaps, the ubiquitous Sweet-brier and one or two others, can be afforded; but where there is any considerable area or a shrubbery, a selection of single Roses is always desirable. Besides the blossom, some beauty is produced later by the fruit, which is often of bright reddish colors.

For ordinary massing effects, some of our own native wild Roses are as good as any which could be procured. The earliest to blossom, and one of the most dwarf, is the northern Rosa blanda, whose stems are only one or two feet high, and possess the pleasant character of being without prickles. The rose-colored flowers are larger than those of most of our species, the petals being minutely streaked with white, and opening here about the first week of June. Another dwarf species is R. nitida, with slender stems densely covered by slender bristles, and blossoming a week later than R. blanda. The flowers are of a deeper rose color and the foliage is bright, shining above, whereas the leaves of R. blanda are of a rather dull green on the upper surface. Of larger and stronger habit than either of these, and the commonest Rose on many New England rocky hill-sides near the sea-shore, is the shiny leaved R. lucida, which blossoms fully as late as R. nitida, and has a few strong, hooked prickles instead of numerous bristles. Along the cool shores north of Boston it is in blossom in July, and where exposed or on poor soils is often quite dwarf, or only a few inches high. It is a good plant for a natural shrubbery at a sea-shore place. The tallest in habit and the latest to bloom among New England species is R. Carolina, common along road-sides and wood-sides, especially in moist situations. Its smaller flowers, in this region, will begin to expand about the second week of July, or when the last blossoms of R. lucida are fading away. Like R. blanda, the leaves of this are dull, and not shining above, but the tall stems, commonly five or six feet high, are armed with a few prickles.

West of New England and toward the Pacific side of the continent there are several other species of erect-growing Roses, which would undoubtedly be well worth planting in shrubberies. One of the most distinct of these is Rosa Nutkana, a very tall-growing thick and strong-stemmed species, with peculiarly clear light rose-colored flowers, which are in their best condition in the regular Rose-blooming season. It is a much stronger, more rank-growing Rose than any of our eastern species. Of course, the Michigan, or Prairie Rose (Rosa setigera), should be included where any number of kinds of wild Roses are brought together. Its long trailing habit and immense clusters of very late rose-colored blossoms distinguish it at once from any other species. It is not very rare in cultivation, although the total lack of fragrance in the blossoms is against its popularity. It is a most profuse bloomer, and when in bloom one of the most showy of Roses as regards mass of color.

Among foreign species, Rosa acicularis and R. alpina of Europe are the earliest of all to blossom here, in advanced seasons the first buds opening about the third week in May. In good soils both will grow five or six feet or more in height. The flowers are similar, large, of the usual rose color; but, for picking, those of R. alpina are the most desirable, because the stems are usually perfectly smooth and free from prickles. Our old thornless Boursault Rose, with semi-double flowers, is traced to R. alpina stock.

The single Burnet, or Scotch Rose (Rosa spinosissima), with white or light-colored flowers, is among the most attractive. Given good soil and plenty of light and air, the plants will become neat bushes, from two to four feet high, well clothed with fine foliage, above which appear an abundance of bloom early in the season, before the best of ordinary garden Roses have blossomed. The double or half-double forms are most commonly seen in cultivation, but these single ones, with their centre of yellow stamens, are certainly more delicate and charming. The usual color of the flowers is white or yellowish white, or distinctly yellowish, while some forms are decidedly pink. They have received varietal names in some catalogues, and some are probably hybrids. The stems are usually very prickly.

The double White Rose of old-fashioned gardens is a product derived from a very large, pure white-blossomed wild species of the Old World and known as Rosa alba. Like the double form, it is an erect-growing bush, with stiff stems, and with leaflets, usually in fives, glaucous on the upper surface and somewhat downy beneath. It is worth introducing into a collection to contrast with the many species which produce the usual rose-colored bloom. Where space for only one single-blossomed Rose can be afforded, we usually expect to see the place given to the well-known, tall-growing Sweet-brier, which, brought early by colonists from the Old World, has now become naturalized in many old fields in the New World.

The Dog Rose (R. canina) is hardly worth planting in a garden when so many better kinds are to be had, but as it is one of the strongest and stoutest growing species it may be placed with good effect among general shrubbery or be used as a background for smaller plants. Its flowers are of a pretty rose-pink, or sometimes nearly white, color. As European nurserymen commonly use R. canina as a stock upon which to graft the choicer garden Roses, especially when a "tree form" is wanted, it happens not rarely that the grafts of imported plants die or are supplanted by the stock, and the expected

blossom results in disappointment and a common Dog Rose. An oddity among Roses is the Red-leaved Rose (R. rubrifolia), the pinkish or purplish red foliage of which is to be placed in the same category as Pissard's Plum, the purple Hazels or dark-leaved Beeches. It is very hardy, and valuable only for its foliage, as the dark-colored single flowers are small and not specially attractive. In good soil it will attain a height of six or eight feet.

There are three Japanese species of comparatively recent introduction which are generally considered to be superior to almost any other single Roses for cultivation, and which are now becoming well known through persistent advertising. These are R. rugosa, R. multiflora and R. Wichuraiana. R. rugosa is very hardy, has handsome, thick, leathery, evergreen-looking leaves and the largest blossoms of any single Rose which can be grown in this climate. The white variety, or R. rugosa alba, with petals of the purest white color, is certainly very beautiful. The stems are very prickly, but the species possesses so many other desirable qualities that propagators have used it extensively in artificial hybridizing, and with some promising results. It is not true, as some catalogues assert, that it is free from insect attack, although, no doubt, the thick leaves are not so readily devoured as those of more tender species. The true R. multiflora, with large clusters or panicles of small white flowers, is rapidly gaining popularity. It is of strong and rapid growth in good soil, and will readily reach to the top of a post or pillar ten or fifteen, or even twenty, feet high. It was figured in GARDEN AND FOREST, vol. iii., p. 405, and a picture of a plant in bloom was published in vol. iv., p. 535.

Rosa Wichuraiana is one of the latest arrivals in our plantations, where it is also one of the last to blossom. It has shining leaves, the low-trailing habit of a Dewberry or Trailing Blackberry, with stems fast growing to many feet in length, and producing clusters of pure white flowers, each averaging nearly two inches across. The odor of this and of R. multiflora is more like the Banksian than like the ordinary Roses. A plant of the single yellow or Copper Rose is always interesting in bloom, but the usual experience in this climate is that they are not very enduring or long-lived.

In selecting only half a dozen species for a small garden R. alpina, for earliness; R. spinosissima, R. rubiginosa (Sweetbrier), R. multiflora, the red and white R. rugosa and the Prairie Rose would probably give most satisfaction. In general, shrubberies of any extent, and especially in exposed situations, our indigenous species should receive first consideration.

Arnold Arboretum. *J. G. Jack.*

The Rock-garden.

AMONG the many lovely and interesting plants now in bloom in the rock-garden, none are more effective than the well-known Sea Pink, Armeria maritima, of which there are several varieties, including a white one. The one known as Laucheana, of a deep rose-color, is the brightest. As rock-plants the Sea Pinks are most satisfactory, covering the ground at all times with a carpet of green. I have thought that many Alpine plants, particularly European species, suffer more from summer heat than from extreme cold in winter. This is the case with the Gentianella, Gentiana acaulis. In spite of good conditions of soil and moisture, our plants gradually grow less. G. cruciata, growing at a lower altitude, does better. From a few seeds scattered about three years ago, we have a fine lot of healthy, blooming plants. The flowers of this handsome species are bright blue and borne in clusters at the ends of the flowering stems. Callirhoë involucrata, the Poppy Mallow of the western states, perpetuates itself quite freely from self-sown seeds, but it is never obtrusive. This neat trailer carries an effective display of bright pink flowers from spring until autumn.

Erodium Manescavi, the Giant Heron's Bill, is perfectly hardy here, although not considered so in England. It bears tufts of Fern-like foliage and bright rose flowers, and is nearly always in bloom. Of the many species and varieties of Dianthus now in bloom, none are more showy than the new Cyclops. They appear to be descended from the old D. annulatus, and are mostly shades of rose with a deeper centre. The Maiden's Pink, Dianthus deltoides, comes up everywhere, and its dense, free-flowering tufts are seldom out of place. D. neglecta, a comparatively rare and beautiful dwarf deep rose-flowered species, from the Alps, holds its own well. It is often hard to find just the place for these delicate little species, but when once established they should not be removed. We had occasion to move D. subcaulescens, one of the dwarfish-tufted species in cultivation, and found that its woody main root extended nearly two feet between the rocks. We find it very hard to re-establish; in fact, it is very doubtful if it will recover the shock of removal. D. dentosus, the Amoor Pink, from south Russia, very much resembles the common Indian Pink, D. Chinensis, in habit and general character of the flowers. They do not vary, however, very much from a lilac-rose limb shading to a darker centre. D. atrorubeus, a tufted species, with heads of small crimson flowers, makes a very interesting addition. D. superbus is a particularly showy and fragrant species from central Europe and Asia, and the variety Gardeneri, from Japan, with extra-large fringed flowers, is the best.

The Alpine Bugle, Ajuga Genevensis, although very handsome when in bloom, increases so fast as almost to become a weed. The flowers are of the deepest blue and borne on axillary cymes in spike-like form. Nothing makes a more effective display when in bloom. This also makes a very effective pot-plant, and has been used, slightly forced, for spring bedding. The varieties, Alba and Variegata, of A. reptans, are less showy, but very useful plants for covering spaces under trees. Heuchera sanguinea is now becoming well known, as it deserves to be. Its tufted habit and neat handsome foliage commend it at all times, while it is more or less in bloom the whole season. The long graceful spikes of coral-red flowers are very effectively used in making bouquets. Rock Roses—hybrids and varieties of several species of Helianthemums—are very showy just now. These are well established with us, and several natural varieties and hybrids have come up in the neighborhood of the original plants. The kinds referred to here are all Old World species, shrubby, and vary in color from red, orange, violet, pink and crimson, some being spotted. There are several sub-shrubby or herbaceous American species, all of which are yellow-flowered. Dwarf Phloxes, with the exception of P. ovata, are all out of bloom. This came to us from southern Virginia, along with Silene Virginica, the Fire Pink. The latter plant is now well established, sowing itself everywhere, which is very fortunate, as being a biennial, at least with us, it would be in danger of being lost. Gypsophia repens and G. cerastioides, starry, white-flowered tufted species, are unfortunately not long-lived, owing apparently to exhaustion during blooming, which occurs during the hot season. This is rather what may be expected, since they are both alpine species, the former from the Alps, and the latter from the Himalayas. By putting in a few cuttings yearly, and growing them without blooming the first season, a good stock can be kept up.

We find the Day-lilies, Hemerocallis Mittendorffiana and H. Thunbergii, very graceful and effective plants for the rock-garden, and never obtrusive; these clear yellow flowers giving here and there a touch of color. One of the commonest and best of the bell flowers is Campanula Carpathica. It comes up everywhere, and never to the extent of becoming a nuisance. Among seedlings there is considerable variation. The lovely dwarf Italian Harebell, C. garganica, came through the late severe winter in excellent condition. Just now it is perfectly covered with light blue flowers. C. rotundifolia, with charming pendent bells, is a very common wild plant throughout Europe. Its distinct character makes it a very interesting addition. While C. macrantha may be more properly classed as a border-plant, it is not out of place here, standing alone among tufted plants. Its monstrous bells are nearly, if not quite, as large as those of the common Canterbury Bell, and droop gracefully.

Geranium sanguineum is more or less in bloom the whole season. As a rock-plant it is very satisfactory, taking care of itself and never becoming obtrusive. A large clump of Spiræa astilboides stands out in pleasing contrast. As a border-plant it is far superior to the common Astilbe Japonica. Achillea aurea, with dense heads of deep yellow and tufted Fern-like foliage, is all that can be wished as a rock-plant. Papaver alpina, with much cut glaucous foliage and handsome flowers of varying tints, mostly red, white and rose, sows itself freely, so also does the yellow-flowered Iceland Poppy (P. nudicaule). It is fortunate they do, as, being biennials, they are short-lived. Saponaria ocymoides behaves here very much as a biennial, dying after the blooming season. We shall never be without it, as seedlings are coming up by thousands. Œnothera Fraseri, belonging to the suffruticose group of Evening Primroses, is the only one adapted to growing in the rock-garden. It grows about one foot high and bears numerous yellow flowers. Œ. Missouriensis is well-established here, its large, handsome, sulphur-colored flowers being produced from spring until autumn. The handsomest of all the Milk Vetches is Astragalus Monspessulanus. It is a low-growing sub-shrub with pinnate foliage and rosy purple, Pea-like flowers. Lotus corniculatus is another leguminous species with pretty Pea-like yellow flowers. I note a number of seedlings, self-sown. Aster alpinus speciosus is a giant form of the common Alpine Aster, with flowers two inches across on stems

one foot high, of a lovely lavender-blue shade. Phyteuma Charmelli is a lovely campanulaceous plant with compact heads of deep blue flowers and neat deep green tufted foliage. The Rocky Mountain Columbine (Aquilegia cœrulea) does not seem to be more than a biennial with us, and it is necessary to keep up our stock by raising seedlings every year. Potentilla tridentata occupies several clefts of rocks, and is admirably suited for such positions.

Wellesley, Mass. *T. D. H.*

Plants in Bloom.

AMONG the notes from Lily fanciers there seems to be little mention of Lilium longiflorum and L. Harrisii except for forcing, yet these are among the best of the varieties for the garden, for they are the most manageable of all Lilies, and flowers can be had in constant succession at most, if not all, seasons. Every one who has a greenhouse, or any facility for forcing plants, now grows Easter Lilies, and tries especially to secure flowers from Christmas till Easter, and their treatment for this purpose is well understood. They are equally satisfactory at other seasons, and with only slight extra care in forwarding or retarding, the flowers may be had at about any date desired. These bulbs may be considered reasonably hardy in this latitude, by which I mean that there is a fair chance of their living over winter with the protection usually given to all Lilies. L. longiflorum will sometimes thrive in gardens for years and then die suddenly some winter under special conditions. In this respect it is like many other plants classed as hardy. It is better, however, where plants require special treatment, to grow them under conditions where they may be somewhat controlled. The Lilies which are now flowering with me were potted up late last fall and plunged out-of-doors, under a covering of leaves. They were frozen up most of the winter and made no progress at the top. They were removed to cool quarters under glass in February or March and made a start, the forcing being of the mildest. On the approach of moderate weather they were plunged in the border, where the different plants have been coming into bloom for several weeks, and the last of the little lot will flower in July. With a stock of these bulbs in pots, some of which may be kept in the open without even this trifling forcing, and retarding early by extra dryness and later by cool quarters, I do not see why the season cannot be extended quite into the fall. Some bulbs of the variety Formosanum of L. longiflorum, which I potted up late in February, came into flower in about 110 days with no forcing, and seem to be of quicker growth than either the type or L. Harrisii. If that proves to be its constant habit it may be found a good variety for the earliest forcing.

The first of the Japanese Irises are now in their glory, their form and colorings quite distinct from that of other species of the family. These are thoroughly satisfactory and hardy plants, and I am glad to see that the plantsmen have awakened to their usefulness, so that they are becoming fairly common. Lately the plant-agent has been going his rounds with Japanese albums glowing with dazzling pictures of Kæmpfer's Irises in every possible combination of color which a trained imagination could conceive. The colorings of these Irises are generally rather sombre, usually in maroons and purples. The pure white variety, Pearl, seems to me to be the handsomest of all these varieties, and, in fact, the most charming of white Irises. The petals have a crape-like texture, slightly veined with only an obscure dash of yellow, nearly veiled by the standards. As the rhizomatous Irises, German hybrids, etc., have finished flowering, it will be well to separate and replant those which require moving. This is the best season for that purpose, as they soon will make a new growth and become well established before winter if moved in July. If allowed to make this second growth before moving they do not take hold well when moved later, and their flowering the next year is but a feeble one.

One disadvantage of a small garden is that one cannot have an acre or so of Poppies, the gayest and most blithesome of flowers. Though forced to content myself with a few plants here and there from seed scattered in the fall or winter rather promiscuously, I very much fancy the whole family. The modest little Papaver nudicaule always greets one cheerfully early in the year, and is a persistent bloomer through the summer if not neglected. P. orientale quite speaks for itself in season, and is scarcely over when the beautiful Shirley Poppies show their modest form. With the daintiest, purest tints, and petals as light as air, they are true types of the joyous summer. The Tulip Poppies (P. glaucum) are a welcome addition to the garden. The flowers are selfs of a deep pure scarlet. There are two large petals which form a perfect circle when extended. The two inner petals are smaller, and usually form a cup inside the outer ones. Black blotches occur only on the smaller petals.

Alströmeria hæmantha is also a flower of which we have too few. This variety of the Chilian Lily has outer petals of the purest baby-pink. The narrower inner ones are lined with blood-red on a ground of yellow bordered with pink. Most exquisite flowers these, of the choicest character, and very useful for cutting. The plants seem as hardy as any of the family, doing well in a warm border. I have always promptly lost Alströmerias when I coddled them.

Elizabeth, N. J. *J. N. Gerard.*

The Cultivation of Sweet Corn.

AFTER many years of experiments with varieties of Sweet Corn, I am still in doubt as to which varieties are the best. The introduction of the Cory, a few years ago, marked a decided advance in the early sorts. A great many other varieties have since been sent out as superior to the Cory, but I still plant it almost exclusively for earliest use, although its quality is not as good as we demand in later kinds. Its earliness and the comparatively large size of the ear have thus far made it indispensable in my garden. As a medium-sized sort for home use I have always preferred the Black Mexican to all others. Its quality is above reproach, but it must be used, to be at its best, before the kernels begin to color. It is not suitable nor profitable for market. For late use I continue to plant quite largely of Stowell's Evergreen. It is good for home use as well as for market, and can be made to yield heavily. This year I have planted most largely the variety sent out by seedsmen as Mammoth Sweet Corn. I think highly of it, also of the variety recently introduced as Shoe-peg and Country Gentleman. This latter has a good-sized ear, with kernels that run deeply into the cob, and is of fine quality.

I find that soil, season, and, perhaps, culture, have considerable influence upon the quality of all varieties. Usually the sweetest and tenderest corn is grown on sandy soil and in a warm season, while on heavy clay soils, or in wet cold seasons, the same variety may be greatly inferior. Good treatment as to manure, and especially in the application of phosphatic fertilizers, also seems to improve the quality.

Well-grown sweet corn is usually a salable article, and, consequently, its cultivation promises better financial results than field corn. I invariably plant in drills, leaving the plants nearly twice as close together as in the case of ordinary field varieties. On good soil the sweet varieties stand a little crowding quite well, and when rather thickly planted have always given me the most satisfactory returns. Of the earliest sorts, like Cory, there may be a plant every two or three inches in the row, the rows two and a half to three feet apart. The medium varieties, like Black Mexican, may stand four or five inches apart in rows three feet apart, and the later varieties, like Evergreen and Shoe-peg, six inches apart in rows four feet apart. To provide for a supply late in the season, Evergreen, or other varieties of that class, should be planted as late as July or August, according to latitude.

La Salle, N. Y. *T. Greiner.*

Correspondence.

Dutch Bulbs in America.

To the Editor of Garden and Forest:

Sir,—Garden and Forest, and other gardening papers as well, have published numerous articles upon the possibility of raising Dutch bulbs for commercial purposes in the United States, the most desirable part of the Union for the purpose, in the opinion of many of the writers, being North Carolina. A week or two ago Texas was mentioned as especially fitted for the purpose.

Why not add Massachusetts to the list, and, indeed, nearly every state in the Union, for Dutch bulbs can be raised, no doubt, in nearly every one? Massachusetts would appear to be better adapted to the needs of some bulbs than Texas, for it appears, by a recent letter, that the Tazetta varieties of Narcissus are frequently injured by late spring frosts in that state, and that the varieties of N. poeticus do not succeed unless planted in the shade, neither of which is true in Massachusetts.

As for the Hyacinth, I have experimented with many varieties and have raised from offsets bulbs which gave as fine spikes as newly imported specimens of the same varieties bought for the sake of comparison. The Roman Hyacinth in all its forms and colors—white-skinned and red-skinned, white, pink, blue and yellow-flowered—succeeds very well with slight

protection. My friend, Mr. C. A. Putnam, has raised Hyacinths from seed to the flowering state, and has obtained good results.

Yet I do not believe that Massachusetts or North Carolina or Texas will ever give the Dutch growers a moment of uneasiness. We can grow bulbs, but we cannot grow them cheaply enough to compete with the Dutch. After three years cultivation I can turn out a Hyacinth-bulb which will give a perfectly satisfactory flower-spike, and I can import the same variety for the sum of six or eight cents; manifestly my profit will be small. Narcissus poeticus is offered by some reputable firms at less than two shillings a hundred, Crocuses at one shilling a hundred for named kinds, and half a shilling for mixed varieties. Moreover, if a margin of profit existed, it is not likely that southern-grown bulbs would be satisfactory. The Bermudan Easter Lilies appear to be going out of favor. Lilium candidum, grown in Italy, gives flowers sadly lacking in substance, and one of the most careful dealers I know tells me that he declines to handle Tuberose-bulbs from the south. I believe that failure and loss await those who shall go into the Dutch bulb business in this country.

Canton, Mass. *W. E. Endicott.*

The Columbian Exposition.

Plants in Bloom.

THE last week in June saw a great variety of plants in bloom at the World's Fair, although there were no masses which could compare in boldness of effect with the Azaleas and Rhododendrons of a month ago. In the Horticultural Building the chief bloom is still in the Orchid collection of Pitcher & Manda, although many of the species are now passing out of season. Cattleyas, Cypripediums, Oncidiums and a few others are yet in condition, and Anthuriums are conspicuous. The great tub specimens of Marguerites, which have been used with excellent effect to fill vacant places in the plant exhibits in the building, are still making a show, although far past their prime. The bold masses of these plants in the early days of the Exposition produced most striking and happy effects. A few Cannas and Hydrangeas are in flower in the building, but the variety of bloom inside is not great. The only prominent bloom alongside the Horticultural Building is the Pansy collection, which is now in good condition. The Pansies seem to have fallen short of expectations in size and brilliancy, but they are, nevertheless, attractive, because of the enormous number of plants. The thin partitions of grass which separate the exhibits in the largest beds have grown tall and loose, and give the beds a weedy and unkempt appearance. A mixed collection of small plants is coming forward in the borders in front of the propagating-houses in the rear of the Horticultural Building. Upon two sides of the Woman's Building the neat yellow and brown Pea-like flowers of Cytisus (or Genista) Andreana were conspicuous until the middle of June. These plants were exhibited by Croux, of Sceaux, and Moser, of Versailles, France. The former shows only low plants, but Moser has an interesting group of standards worked four or five feet high on Laburnum stocks. This plant deserves greater prominence in America. Vilmorin, Andrieux & Co., of Paris, show beds of various annuals about the little White Star Line Building, just north of the Horticultural Building. The plants in bloom in these beds at the close of June are Pinks, Coreopsis of two or three kinds, Calendulas, Marigolds, a Gaillardia called Pictamixta, Snapdragons, Eschscholtzias, Helichrysum and Chrysanthemum carinatum.

The most interesting and conspicuous floral displays are upon the island. The Roses are now coming forward in great quantity and variety, but an account of them must be delayed for a separate letter. The island ornamentation divides itself into two general classes—the exhibition plots and the landscape features about the shores. The exhibition plots contain a general line of bulbs and perennials, with a few annuals, from various American and foreign dealers. Many of the exhibits have no signs or labels to designate the exhibitor, and very many of the plants are not labeled. This neglect detracts greatly from the exhibits to one who desires to take more than a cursory glance at them. The beds are arranged without reference to landscape-effect, a circumstance which finds excuse in the large number of exhibits to be placed in a small area and the lateness with which some of the exhibits appeared; yet it would seem that more might have been done to give a continuous artistic expression to the island. The beds appear to have been cut from the sod in any shape which pleased the fancy of the exhibitor, and exhibits which might have been placed close together with good effect are widely separated. But the displays are so instructive, and interest so many visitors, that one is tempted to withhold criticism.

The greatest show, since the Rhododendrons, has been made by Pæonies, which have been shown in large assortment by Cannel, of England, and also by B. A. Elliott, Ellwanger & Barry, Pitcher & Manda, and in the Japanese Garden. These collections are so widely scattered that it is difficult to make comparisons between them. As a whole, the Pæonies have done fully as well as could have been expected in the hasty preparation of land which was necessary to the construction of the island. The black soil with which the island has been covered is still soft and loose and it dries out quickly. At the close of June, the Canterbury Bells, which afford a temporary filling about shrubs and unoccupied borders, are making a great show. A variety of Stocks has been used for similar purposes, especially in the German section; and Aquilegias are pressed into like service.

The most conspicuous herb, aside from the Pæonies and Canterbury Bells, is Œnothera Youngi, which is used for a dense border about two large beds of Rhea Brothers, Norwood, Massachusetts, and also by B. A. Elliott, of Pittsburg. This is a strong plant, with firm, shiny foliage, growing to a height of two feet and bearing a profusion of bright lemon-yellow flowers, which remain open throughout the day. The largest exhibit of herbaceous plants is made by Pitcher & Manda, and it has the distinct merit of being labeled, as a whole, with separate large labels for nearly every species. Among the prominent flowers in this exhibit, at the present time, are Pyrethrums in variety, Gaillardia grandiflora, Coreopsis lanceolata, Papaver nudicaule, Dianthus barbatus, Astilbe Japonica, Tradescantia Virginica, Tunica Saxifraga and Forget-me-nots. Perennial Phloxes are coming into bloom in a number of exhibits, the chief ones at present being Colonel Flaterer and Beauty of Mirande, in Elliott's beds. Rhea Brothers show a variety of Aquilegias, Lychnises, Geranium Ibiricum, Geum miniatum and Pentstemons and Delphiniums. Kalmia latifolia, from European growers, has bloomed profusely upon the island, and also about the Women's Building, and it must have been a revelation to thousands of people who have never seen our Mountain Laurel in its natural haunts.

The second part of the floricultural display upon the island is that which is used to accentuate the wooded margin of the lagoons. As seen from the outside, the island is intended to have a wholly wild and natural appearance, but from the inside the borders are designed to look somewhat more trim and gardenesque. This margin, about sixty feet wide, is in the hands of the landscape department. It requires the nicest taste to introduce flowering herbs into a wooded border without overdoing it. The faintest suggestion of color here and there gives a truer effect than bold and protruding masses, for it is then properly subordinated to the spirit of the composition, while it is enough to give a feeling of completeness and finish. These flowering plants have been introduced into the borders, against the shrubbery, with most dainty effect, and one is surprised to see what interest such frugal plantings may add to a landscape. J. C. Vaughan has contributed a running exhibit to these borders. Among the plants which give very pleasing effects are the following familiar species: Pinks, Candytuft, Wallflower (Hesperis), Pyrethrums, Bachelor's Buttons, Foxgloves, Sweet Williams, Daisies (Bellis), Bleeding Hearts, Dusty Miller (Lychnis Coronaria), Wild Thalictrums, Saponaria ocymoides, Geum atrosanguineum, Forget-me-nots, Corn Poppies, Papaver nudicaule, Pink Yarrow, Anemone Pennsylvanica, Canterbury-bells, Irises, Perennial Phlox, Lythrum Salicaria, Potentilla fruticosa, Columbines and Larkspurs.

Other bloom will follow in succession throughout the season. Hydrangeas, Lilies and Dahlias will be particularly prominent. Considering the short time in which the exhibits have been secured and the difficulties attending the work, the collection of flowering plants is very pleasing.

Chicago, Ill. *L. H. Bailey.*

Notes.

The Bordeaux mixture has been used with success in experiments by the Department of Agriculture to rid fruit-trees of lichens which adhere to the bark of the trunk and limbs. The mixture was applied with a whitewash brush and the lichens at once turned yellow, and within three weeks were all dead. Later experiments showed that equally effective results could be had with the ordinary spraying machine.

Mr. George Nicholson, the curator of the Royal Gardens at Kew, well known to horticulturists in this country as the author of the useful *Dictionary of Gardening*, and the authority in England on hardy trees and shrubs, arrived in this city last week. Mr. Nicholson will spend a couple of months in this

country, where he comes to study the collections in the Arnold Arboretum, and to serve as a judge in the Horticultural Department of the Columbian Exposition.

We have received from Mr. Joseph Meehan a flowering branch of Cedrela Sinensis. The tree from which it was taken stands in the Meehan nurseries at Germantown; it is twenty-five feet high, and is now flowering for the first time. The individual flowers are small, almost pure white, and are borne in a very large open panicle about two feet long and pendulous. They have no odor, and the tree is, therefore, not objectionable in this respect, as is the Ailanthus, which it so much resembles in general appearance.

The Mouse-ear, Hieracium Pilosella, has recently been found by Miss Mary Hunnewell, of Wellesley, Massachusetts, naturalized, by the road-side in that town. This is a pretty little perennial species with spreading tufts of reticulate leaves and creeping leafy barren shoots, lanceolate entire leaves tapering at the base, green above and white on the lower surface with short stellate down. The flower-stem produces a single head of lemon-colored flowers tinged with red. It is a common perennial in Europe and Russia from the Mediterranean to the Arctic regions, growing in dry pastures or on banks and by road-sides. As far as we know it has not been found before growing spontaneously in this country.

Under the name of Regina alba, says a Viennese horticultural journal, the trusting European public has recently been offered, from America, the seed of a fodder-grass proclaimed to produce most astonishing crops. But a careful examination at the hands of Monsieur Henry L. de Vilmorin, working at the instance of the Agricultural Society of France, has proved that the proffered seed does not belong to a mysterious new plant, but is simply that of Reana luxurians, which European seedsmen sell at eight francs the kilogramme, while twenty-five francs is charged for the American commodity. Moreover, the seed is not recommended at any price, for, in France, at least, Reana luxurians has been found a worthless grass.

The leading article in *Harper's Magazine* for July is devoted to the great Italian gardens, whose formal designs were the natural outgrowth of the art and architecture of the time of the Renaissance. The illustrations are from photographs, which reproduce portions of these gardens as they now appear, the selections in the main attempting to bring out certain original features which have survived the neglect of years and the reconstructions which have come with changing tastes and fashions. Some of these pictures, as, for example, that of the Piazza de Siena, in the Villa Borghese, are very attractive, and all are instructive, as revealing, even in the ruins of these famous works, the motives which guided their original designers. The article was prepared by Mr. Charles A. Pratt, who will continue the subject in the next issue of the magazine.

The New York market is now well supplied with domestic fruit. Astrachan and Early Harvest apples are coming from Georgia in a fair supply, though not of the best quality. Le Conte pears are coming from the same state, while Niagara grapes are coming from Florida, and Wild Goose plums from South Carolina. The finest peaches now are the Alexanders and Garlands from California and Hale's Early from North Carolina. Cherries are abundant and very cheap, the varieties from California being mainly Napoleon Biggereau, Centennial and Royal Anne. Wilson blackberries are still coming from Maryland and Delaware, while good raspberries come from the Hudson River valley and huckleberries from New Jersey. Southern watermelons are very abundant and good, while fine muskmelons are scarce, most of the latter being shipped from Charleston.

In an interesting note upon the Lilac, published in a recent issue of the *Revue Horticole*, it appears that the variety Philemon, which is probably the handsomest of all the dark-flowered varieties, was raised as long ago as 1840, when it was found among a lot of seedlings by Monsieur Pierre Cochet, of Coubert, France, who named it for his oldest son. This variety was first sold in 1846, and at the Universal Exposition of 1855 it received a medal of the first class. The writer in the *Revue Horticole* expresses surprise, in which we share, that this beautiful variety is still so little known. Other varieties which are commended in this article are Marie le Graye, which is still the finest white-flowered Lilac; Lucie Baltet, described as exceedingly floriferous and as producing short compact clusters of old rose (vieux rose passé) colored flowers, and Clara Cochet, discovered at Suisnes among a lot of seedlings thirty years ago, although only recently placed on the market. The flowers are described as flesh color, shaded slightly with pale lilac.

The Tree-planting and Fountain Society of Brooklyn held a special meeting last week to consider ways and means of protecting trees in that city against the gnawing of horses and injuries by neglected guards. Trees in that city are also much disfigured by having bills posted upon them, churches and Sunday-schools being conspicuous offenders by advertising picnics and excursions in this way. There is an ordinance of the city against pasting or nailing handbills or notices upon trees in public streets, and there is a law of the state making it a penal offence to girdle or injure any fruit, shade or ornamental tree which stands on the lands of another or on public property. A copy of these ordinances has been prepared for general distribution, and a committee has been appointed to confer with the city authorities in reference to the prosecution of all persons who injure or deface trees or shrubs in violation of law. The formation of street-tree clubs in various parts of the city was also recommended, whose members are to interest themselves not only in the enforcement of the law, but in calling the attention of citizens to the importance of examining the guards about their trees and removing such as are causing injury.

In an article in the *American Agriculturist* entitled "Flower-seeds to be Sown in July," Mr. C. L. Allen writes that if seeds of the perennial Delphiniums are now sown and protected from drying winds by lattice frames or light boughs they will germinate quickly and make plants strong enough to withstand the winter. Pansy-seed for autumn flowering might now be sown, although this will also need protection against the sun. If carried over in a frame during winter the plants will be in the best possible condition for early spring flowering. The seed of the Oriental Poppy should be sown as soon as they ripen, for they lose their vitality very quickly. The seedlings are difficult to transplant, and it is a good plan, therefore, to sow the seed where the plants are to remain, preferably among annuals, where the ground is not densely covered, as they root deeply, and the shade of the annuals will be rather a help than a hindrance to their growth. If Hollyhock-seeds are sown as soon as they are ripe in deep rich soil the plants will bloom next year. All the Dianthus family, including hardy Carnations and Picotees, can be had in perfection next season if the seed is sown this month and the seedlings transferred when two inches high to the places where they are to bloom. Mignonette from seed now sown will make an admirable growth in the cool moist weather of September, and will give strong spikes of flowers in autumn. The seed of the White Rocket Candytuft sown this month also will make flowering plants in September, which will continue to bloom until frost.

A bulletin on the Rape-plant has just been issued by the Department of Agriculture. The need of some fodder-plant to furnish supplies of pasture after the crop of Indian Corn has been harvested and before winter sets in, has long been recognized as a necessity in this country where autumn pastures often fail. This want has been more severely felt in the case of sheep than of cattle, and Professor Thomas Shaw, of the Ontario Agricultural College, thinks that the Rape-plant will meet this need. Rape, which is a cruciferous plant belonging to the genus Brassica, can hardly be distinguished in the early stages of its growth from the varieties of Swede Turnip, although there is a marked difference in the habit of the root-growth between the two species of plants, the leaves and stems of Rape being the only portions that furnish food. The variety of Rape known as the Dwarf Essex has been grown to a considerable extent in Canada within late years, and although it has been mostly cultivated in the county of Wellington, experiments show that it can be had of good quality in every province of the Dominion. A large percentage of the Canadian lambs which are now shipped to the Buffalo market have been finished on Rape. On the farm of the Ontario Agricultural College at Guelph, it was first introduced as a hoed crop for the purpose of destroying various forms of noxious weeds. It proved very valuable for this purpose, since it is sown late in the season, and the required cultivation is peculiarly fatal to weeds, but, besides that, it made very cheap and effective pasturage. It is thought, moreover, that it will make an excellent soiling crop in the northern states, and will also serve a good purpose as green manure. It has remarkable fattening properties, its nutritive ratio being very high, or about as one to three, while Red Clover in blossom is only 1 to 5.7. An average crop grown in drills should furnish not less than ten tons an acre, and when the conditions are favorable it is quite possible to produce twenty tons of green fodder to the acre.